ARCADIS
Infrastructure · Water · Environment · Buildings

ARCADIS
10559 Citation Drive
Suite 100
Brighton
Michigan 48116
Tel 810.229.8594
Fax 810.229.8837
www.arcadis-us.com

ENVIRONMENT

Mr. James Saric
Remedial Project Manager
USEPA Region 5
77 West Jackson Boulevard
Mail Code: SR-6J
Chicago, IL 60605-3507

Subject:
Area 3/Former Otsego Impoundment:
Proposed Reconnaissance Plan and Preliminary Sampling Design

Date:
June 1, 2012

Contact:
Michael J. Erickson

Phone:
810-225-1924

Email:
michael.erickson@
arcadis-us.com

Our ref:
B0064531.00500

Dear Mr. Saric:

The March 2012 *Area 3/Former Otsego Impoundment Supplemental Remedial Investigation/Feasibility Study Work Plan* (Area 3 SRI/FS Work Plan; ARCADIS 2012) – approved by the U.S. Environmental Protection Agency (USEPA) on May 10, 2012 – describes survey activities and soil and sediment sampling designed to:

1. document the current physical conditions of the Kalamazoo River and the river banks in Area 3 of the Allied Paper, Inc./Portage Creek/ Kalamazoo River Superfund Site (Site)

2. supplement the current characterization of the nature and extent of polychlorinated biphenyls (PCBs) in sediments, river bank soils, and floodplain soils in Area 3

3. support identification and screening of a range of potential approaches and technologies for remediation of Area 3.

The Area 3 SRI/FS Work Plan identifies two investigative phases based on the iterative approach employed in Area 2 (Otsego City Impoundment). Phase 1 is a floodplain soil, sediment, and land use reconnaissance. After the reconnaissance information is evaluated, Phase 2 – survey and supplemental soil and sediment sampling – will begin.

This *Area 3/Former Otsego Impoundment Proposed Reconnaissance Plan and Preliminary Sampling Design* describes the proposed Phase 1 reconnaissance and a preliminary layout for the subsequent survey and sampling activities. The proposed Phase 2 sampling locations, which are based on the preliminary sampling strata identified in the Area 3 SRI/FS Work Plan, will be revised if appropriate and submitted for USEPA approval following the reconnaissance, during which changes to the extent and boundaries of relevant strata may be identified.

Field work will be performed under Agency oversight by ARCADIS personnel familiar with the area and Site. Work will be performed consistent with the methods and protocols set forth in the Multi-Area guidance documents (Multi-Area Field Sampling Plan and Multi-Area Health and Safety Plan, ARCADIS BBL 2007a and b).

Phase 1: Field Reconnaissance

The Area 3 SRI/FS Work Plan adopts a geomorphic strata-based sampling approach for soils which presumes physical features and their changes over time have shaped the current distribution of PCBs. In Area 3, a portion of the floodplain was historically inundated when the Otsego Dam was in operation. Topographic or bathymetric variations associated with historical position of the river in times prior to impoundment are associated with geomorphic features of the current floodplain that may have accumulated higher amounts of PCB.

The purpose and objectives of the Phase 1 reconnaissance effort are to:

- Evaluate and confirm or refine preliminary floodplain soil strata boundaries that were identified in the Area 3 SRI/FS Work Plan based on review of current and historical aerial photos, existing PCB data, and high-resolution topographic data. This will be accomplished by a combination of walking and boating throughout Area 3 to confirm whether or not the delineated strata boundaries represent distinct features, based on observations of elevation, vegetation, soil types, and other physical characteristics. The intent is not to survey exact boundaries but to identify the need for any obvious refinements in strata delineation. Noteworthy discrepancies will be located using GPS equipment and marked on a map in the field. This information will be used to confirm or refine the preliminary sampling locations proposed for Phase 2.

- Collect information on the presence or absence of grey, clay-like soils.

- Identify in-channel locations with substantial volume of fine-grained sediment.

- Observe floodplain characteristics and identify general land use. For areas visible from the river, this will be accomplished by a shoreline survey by boat, and those areas photo-documented. General land use, such as residential, industrial, natural, as well as specific local uses, such as gardening or recreation, will be noted.

Reconnaissance Activities

Soils

The activities outlined below are designed to characterize floodplain soil strata in Area 3 (Figures 1a-1d) sufficient to conduct a geomorphic-based soil sampling program that yields results representative of specific strata.

The Phase 1 floodplain reconnaissance will include the following activities:

- A team of ARCADIS personnel and Agency representatives will carry out a site walk over within the limits of the Area 3 study area boundary (see Figures 1a-1d) to document soil characteristics, visible water marks, topographic changes, and vegetation within and at boundaries of the identified geomorphic strata (Figures 1a-1d). Table 1 includes a guide to the key soil characteristics the field teams will observe and document. Field indicators will be noted predominantly by visual assessment. Soil characteristics will be inspected at select locations using hand augers advanced to depths of approximately 2 to 3 feet. Experienced field personnel will identify and record soil characteristics. A global positioning system (GPS) unit will be used to record coordinates of observations, as appropriate.

- Wooden stake markers at key environmental features or feature boundaries will be installed and labeled for reference in future sampling, if appropriate.

- Upstream of the formerly impounded area, floodplain vegetation will be observed, and land use documented along both sides of the river. General land use observations will include residential, industrial, and natural/unaltered lands, as well as specific local uses, such as gardening or recreation (including use of state-owned land by local residents). Locations will be photographed, and visual observations of each tax parcel adjoining the river (see Figures 2-a and 2-b) will be recorded in field notes. Reconnaissance of these areas will be conducted via a shoreline survey by boat, and will include soil auguring to inspect the soil types and

document any observations of grey clay-like soils on parcels where private land-owner access agreements will not be required – specifically parcels owned by the City of Otsego or commercial entities. Access agreements will be submitted to the City of Otsego prior to field activities.

- Shallow soil borings will also be collected in nine focused areas where the current strata boundaries appear to warrant review (see Figures 1a-1d for locations). If appropriate, borings will also be collected in other locations to be determined in the field. At least two shallow soil samples will be collected within each focus area using a hand auger, and the soils will be described and photographed. Additional shallow soil borings may be collected to confirm/refine the strata boundaries in other locations, based on observations made during reconnaissance.

Sediments

Reconnaissance of Kalamazoo River sediments in Area 3 will include the following activities:

- The main channel of the river will be reconnoitered by boat and by wading, with a focus on shoreline areas that may have accumulated fine sediment deposits. Substantial deposits/accumulations (i.e., deposits that are readily visually identifiable and have dimensions exceeding approximately 0.25 acres) of fine-grained sediments within the river will be noted. These sediment deposits will be visually characterized based on texture (fine vs. coarse) at the time of field reconnaissance. Additionally, localized geomorphological characteristics (channel geometry, aggrading bars, terraces, and bank slopes) will be noted. Locations selected by the field crews based on these observations will be probed with Lexan® tubes to retrieve samples for evaluation of the type of sediments present.

- Sediment characteristics will be inspected at multiple locations within identified deposits using hand-driven Lexan® tubes. Cores will be opened and inspected in the field, and materials will be visually described by personnel experienced in core sampling and characterization at the Site. These cores will be disposed in the field, following inspection. Locations for probing with Lexan® will be at the field team leader's discretion. Table 1 includes a guide to the key sediment characteristics the field teams will observe and document. Soft sediment thickness may be assessed using steel rods. GPS coordinates of locations with fine-grained sediment deposits will be recorded.

- Changes in water depth and flow velocity and areas with accumulation of fine-grained materials or identified soft sediments will also be noted.

Phase 2: Soil and Sediment Survey and Sampling

The objective of the Phase 2 activities within the former Otsego Impoundment is to provide soil and sediment data needed to complete the Supplemental Remedial Investigation/Feasibility Study (SRI/FS) reports and associated risk assessment. The final soil and sediment sampling locations and analytes will be identified in a sampling plan to be submitted and approved by USEPA before Phase 2 is initiated. Preliminary components of Phase 2 are subject to change based on observations made in Phase 1 and include:

- Probing of river channel sediments using Lexan® tubes
- Bank profile surveying at select sediment probing transect locations
- Revisiting established erosion pin survey locations
- Sediment, bank soil, and floodplain soil sampling
- Staff gage readings to support hydrodynamic modeling and to establish flood level elevations (flood elevations are not available from the Federal Emergency Management Agency for Area 3; the model will serve as an alternatives evaluation tool in the Feasibility Study)

<u>Phase 2 Survey and Sampling Activities</u>

Sediment Probing and Sampling

New supplemental sediment probing transects will be established at eight locations in the Kalamazoo River upstream of the Otsego Dam. These transects will be positioned approximately at the mid-point between existing PCB sampling transects to essentially double the spatial resolution of the available transect sampling data. Figures 3a-3d show the locations of proposed supplemental transects as well as transects previously sampled by ARCADIS in 1993 and 1994 and as part of the Area 2 investigation in 2010. Transects will be probed between the river banks, and measurements of water depth and sediment thickness will be recorded, along with a description of the sediments.

Sediment cores will also be collected, and a subset from each transect (potentially two to three cores per transect for a total of ~24 sediment sample locations) will be selected in the field in consultation with Agency oversight and submitted to the laboratory for analysis of PCB Aroclors, total organic carbon (TOC), and particle size distribution. Cores will be selected from locations specifically to represent:

- Near-shore sediment where banks have slumped
- Mid-channel sediment
- Distinct sediment deposits along the transects, if observed

Up to 20 additional sediment cores may be collected between transects if distinct changes in the sediment bed are observed (i.e., thickness or composition) or if fine deposits of sediments are identified between transects during reconnaissance activities.

Survey Activities

In addition to new supplemental sediment probing transects, a series of existing and new transect locations will be established for survey purposes only (i.e. transects will not be probed; see Figures 3a-3d). Existing United States Geological Society transects # 1, 3, 5, 7, 8, 9, 10, 11, and 12 will be resurveyed to assess past and future changes in top of sediment elevations. New survey transects will also be placed upstream and downstream of bridges for use in hydraulic modeling. In addition, work will include a survey of the Otsego Dam elevation and other physical features of the dam structure and earthen berm.

Staff Gage Installation

Two staff gages will be installed in the impoundment, one at the Otsego Dam and one at the Lincoln Road Bridge. A previous staff gage located at the Farmer Street Bridge will also be re-established to provide readings in the upstream area of the impoundment. The water elevation at the staff gages will be regularly monitored during field activities, and flows will be measured in conjunction with staff gage readings by recording flow velocities across the river at the Farmer Street Bridge and in Pine Creek upstream of where it enters the river to supplement rating curve data for these locations.

Bank Profile Survey and Sampling

Bank profiling will be performed to characterize the shape and conditions of the bank and to estimate bank losses at locations last surveyed in 2000. At each end of each supplemental probing transect and survey transect (22 transects, 44 locations total), the bank cross-sectional profile will be surveyed. Detailed bank profile elevations will be recorded from the top-of-bank down to the river bed. The top-of-bank, slope-of-bank, and the toe-of-bank under the surface of the water will be surveyed. Grade changes and at least one point beyond the top-of-bank will also be surveyed to reflect the general topography of the floodplain. Survey on the landward side of the bank profile will extend to 30 feet from top-of-bank.

At each end of the eight new sediment probing transects, a top-of-bank soil core will be collected for laboratory analysis, resulting in 16 top-of-bank cores co-located with top of bank profiles described above. Bank soil samples will be collected from the top-of-bank (or within 30 feet of the edge of water if there is no defined top-of-bank) to refusal at the locations shown on Figures 4a-4d to characterize the nature and extent of PCBs in bank soils and estimate potential PCB loading from bank erosion. Samples will also be analyzed for TOC and particle size distribution.

Erosion Pin Survey

In 2000, erosion pins were installed along transects at 10 locations (5 locations along the north banks and 5 matching locations along the south river banks – see Figures 4a-4d) in the former Otsego Impoundment to measure changes in the bank over time and estimate the rate of erosion, where observed. Erosion pins were monitored twice a year through 2002 to document periodic changes in the bank that occurred during that time. Previous erosion pin survey locations will be re-established and surveyed in addition to the top of bank profile locations described above to update prior bank soil and PCB erosion rates presented in the 2003 Erosion Pin Monitoring Data Report, (BBL 2003).

Floodplain Soil Sampling

Preliminary floodplain sample locations have been identified with a goal of collecting sufficient numbers of samples to represent each geomorphic stratum. Table 2 provides preliminary sample densities for each identified stratum within Area 3. Floodplain sampling locations are shown on Figures 4a-4d. Locations are subject to change depending on the outcome of Phase 1 reconnaissance work (i.e., if strata

boundaries are refined or extents are increased, proposed samples may be redistributed within the revised areas).

The proposed sample locations – 74 in total – are shown on Figures 4a-4d and summarized in Table 3. The floodplain soil samples will be analyzed for PCBs, TOC, and particle size distribution. Table 2 provides a summary of existing and proposed floodplain sample densities on a stratum and unit-by-unit basis. Final sample counts and sample locations will be developed based on reconnaissance results.

Schedule

ARCADIS will schedule and initiate reconnaissance activities in collaboration with Agency personnel following USEPA and MDEQs' approval of this plan. Reconnaissance activities are proposed to be performed in June 2012, subject to availability of Agency oversight personnel, and river flow and weather conditions.

Sincerely,
ARCADIS

Michael J. Erickson, P.E.
Vice President

Copies:
Paul Bucholtz, MDEQ
Judith Alfano, MDEQ
Mark Mills, MDNR
Sharon Hanshue, MDNR
Todd Goeks, NOAA
Lisa Williams, Ph.D., USFWS
Jeff Keiser, CH2M HILL
Garry Griffith, P.E., Georgia-Pacific, LLC
Mark Brown, Ph.D., Waterviews, LLC
Martin Lebo, Ph.D., Weyerhaueser
Richard Gay, Weyerhaueser
Kathy Huibregtse, Environ

References:

ARCADIS. 2012. *Allied Paper, Inc./Portage Creek/ Kalamazoo River Superfund Site Area 3/Otsego Impoundment Supplemental Remedial Investigation/ Feasibility Study Work Plan.* March 2012.

ARCADIS BBL. 2007a. *Allied Paper, Inc./Portage Creek/ Kalamazoo River Superfund Site Multi-Area Field Sampling Plan*. October 2007.

ARCADIS BBL. 2007b. *Allied Paper, Inc./Portage Creek/ Kalamazoo River Superfund Site Multi-Area Health and Safety Plan*. May 2007.

BBL. 2003. *Erosion Pin Monitoring Data Report*, March 2003

Enclosures:

Table 1	Types of Field Reconnaissance Observations to be Collected as a Guide to Sampling Plan Development
Table 2	Summary of Existing and Preliminary Proposed Sample Densities by Strata
Table 3	Summary of Preliminary Sediment and Soil Sampling Design
Figures 1a-1d	Focused Reconnaissance Areas in Area 3
Figures 2a-2b	Tax Parcels Related to Area 3
Figures 3a-3d	Proposed Sediment Investigation for Area 3
Figures 4a-4d	Proposed Bank and Floodplain Soil Investigation for Area 3

ARCADIS

Tables

Georgia-Pacific LLC
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Area 3/Former Otsego Impoundment
Proposed Reconnaissance Plan and Preliminary Sampling Design

Table 1 -- Types of Field Reconnaissance Observations to be Collected as a Guide to Sampling Plan Development

Type	Approach
Soil Characteristics	
Texture	Visual – Personnel will note soil type and texture. Personnel will also use the approaches described in the Corps of Engineers Wetland Delineation Manual to describe and estimate the organic content of the soil. [1] Personnel will use a hand auger to depths of up to 3 feet in some areas to better describe soils.
Color	Munsell Soil Color Chart
Saturation	Visual – look for degree of saturation of the soils and note areas and depths of standing water.
Vegetation Cover	Visual – identify dominant types of vegetation and approximate extents of ground cover.
Water marks	Visual – note locations of apparent water marks. These marks may assist in better defining edges of terraces.
Sediment Characteristics	
Overlying water depth	Calibrated rod and distance measuring device – In-side channels, personnel will note water depth (and location) at regular intervals along transect lines, along with edge of water locations.
Texture	Visual and feel – note soil type and texture. Record locations of any observed extensive deposits of sediments in the side channels with predominantly clays and silts. May include use of lexan tubes as necessary to further characterize areas of interest.
Depositional Areas	Visual – look for areas of fine sediment deposits above and below water surface and note coordinates and approximate dimensions of these areas. May include probing using a steel rod to determine approximate thickness of deposits.
Relative flow velocity	Visual – qualitatively note local flow conditions in the local areas of deposits that may be identified and record these qualitatively as part of the description of the area.

Notes:

1. Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Waterways Experiment Station, Vicksburg, Mississippi. Technical Report Y-87-1. This document describes three types of organic soils:
   - 01 – organic matter consisting of visible vegetative matter
   - 02 – organic matter in a form where individual components are unrecognizable to the naked eye
   - A1 – decomposed organic matter mixed with mineral matter

   Percent and type of organic matter in soil are based on visual assessment

Georgia-Pacific LLC
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Area 3/Former Otsego Impoundment
Proposed Reconnaissance Plan and Preliminary Sampling Design

Table 2 - Summary of Existing and Preliminary Proposed Sample Densities by Strata

Geomorphic Unit ID	Geomorphic Unit Classification	Acres	Existing Samples	Proposed Samples	Total Samples	Existing Density (core/acre)	Proposed Density (core/acre)	Total Density (core/acre)
	Outside Geomorphic Units - Islands	1.1	0	0	0	0.00	0.00	0.00
	Outside Geomorphic Units - North Bank Downstream of Lincoln Road	8.3	4	3	7	0.48	0.36	0.84
	Outside Geomorphic Units - North Bank Upstream of Lincoln Road	13.0	0	3	3	0.00	0.23	0.23
	Outside Geomorphic Units - Pine Creek Area	29.2	0	0	0	0.00	0.00	0.00
	Outside Geomorphic Units - South Bank Downstream of Lincoln	23.1	14	2	16	0.61	0.09	0.69
	Outside Geomorphic Units - South Bank Upstream of Lincoln Road	34.4	0	2	2	0.00	0.06	0.06
PC01	Previous Channel	1.5	1	1	2	0.66	0.66	1.33
PC02	Previous Channel	7.8	8	9	17	1.02	1.15	2.17
PC03	Previous Channel	17.4	6	10	16	0.35	0.58	0.92
PC04	Previous Channel	5.5	0	5	5	0.00	0.92	0.92
PC05	Previous Channel	7.4	4	8	12	0.54	1.08	1.62
PC06	Previous Channel	3.1	5	4	9	1.63	1.31	2.94
PC07	Previous Channel	2.2	2	3	5	0.92	1.38	2.29
PC08	Previous Channel	9.2	4	8	12	0.43	0.87	1.30
PC09	Previous Channel	2.4	0	1	1	0.00	0.42	0.42
PC10	Previous Channel	0.7	0	2	2	0.00	2.75	2.75
PC11	Previous Channel	5.6	0	0	0	0.00	0.00	0.00
T1	Terrace	1.0	1	0	1	0.96	0.00	0.96
T2	Terrace	0.3	0	1	1	0.00	3.23	3.23
T3	Terrace	2.0	3	1	4	1.54	0.51	2.05
T4	Terrace	1.3	1	2	3	0.75	1.49	2.24
T5	Terrace	12.6	0	9	9	0.00	0.72	0.72
T6	Terrace	4.8	1	6	7	0.21	1.26	1.47
T7	Terrace	5.5	1	7	8	0.18	1.26	1.44
T8	Terrace	3.1	1	3	4	0.32	0.96	1.28

Total Area 3	202.4	56	90	146	0.28	0.44	0.72
Area 3 - Downstream of Lincoln Rd Bridge	116.0	56	82	138	0.48	0.71	**1.19**

Previous Channel	62.7	30	51	81	0.48	0.81	**1.29**
Terrace	30.6	8	29	37	0.26	0.95	**1.21**

Georgia-Pacific LLC
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site
Area 3/Former Otsego Impoundment
Proposed Reconnaissance Plan and Preliminary Sampling Design

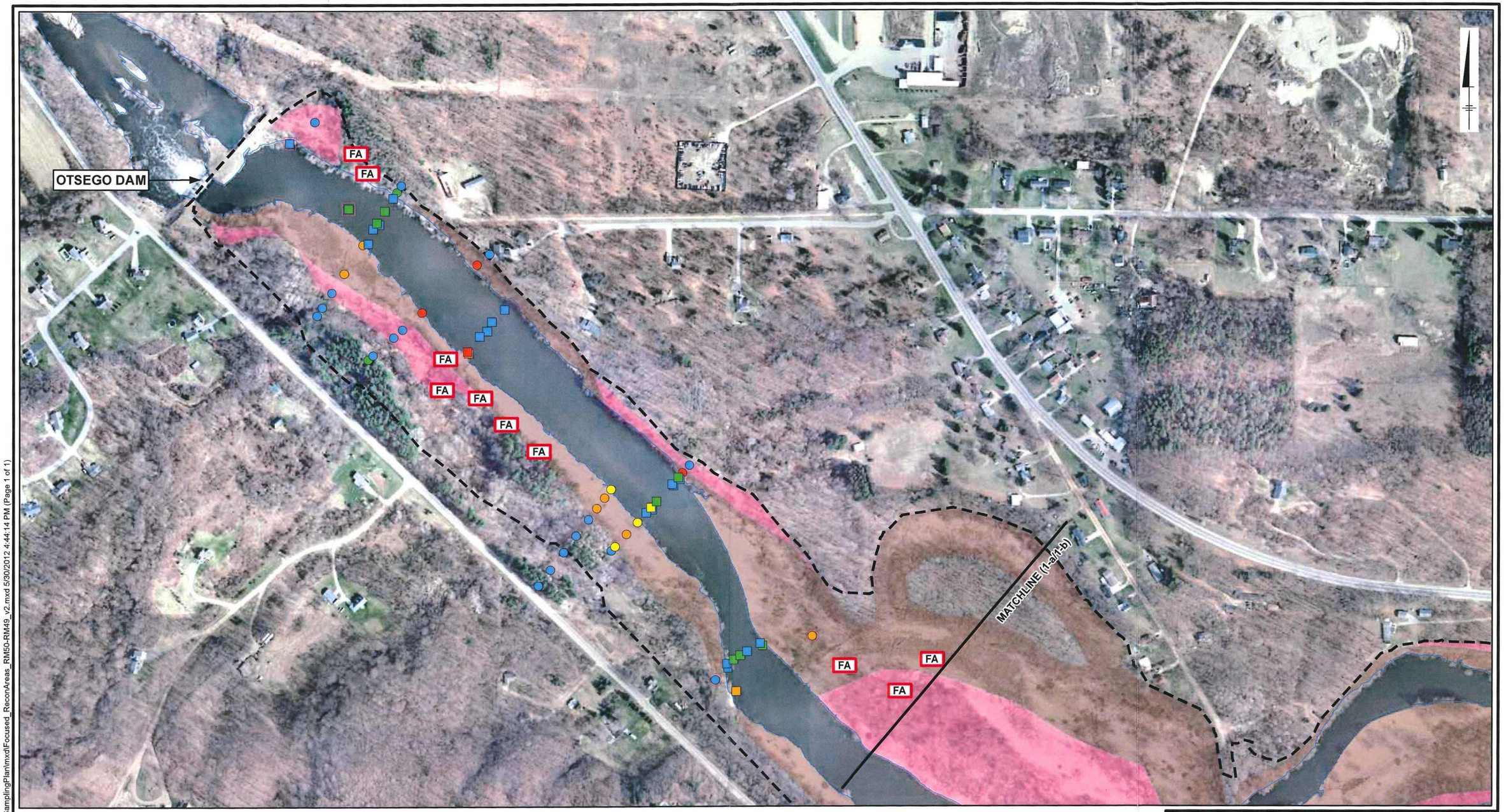
Table 3 - Summary of Preliminary Sediment and Soil Sampling Plan Design

Field Activity	Description	Number of Locations	Location IDs	Sample Intervals	Number of Samples	Analyses
Survey	Bank Profiles - Detailed bank profiles from past the top-of-bank to the bottom of the river, surveyed at 44 locations along both sides of the main channel of the river.	44	OBS-1 through OBS-22 OBN-1 through OBN-22	NA	NA	NA
	River Transects - Establish 8 new probing/coring transects within the Otsego Impoundment and probe sediment at 8 to 10 points along transect including both edge-of-waters for sediment depth. 9 previous USGS transects will be resurveyed and 6 other transects will be surveyed only.	22	ORT-1 through ORT-22	NA	NA	NA
Soil Sampling	Top-of-Bank Sampling - Collect a soil core at the top of the bank at each bank profile.	16	OBS-1 through OBS-20 OBN-1 through OBN-20	0- to 6-inch, 6- to 12-inch, 12- to 24-inch, 12-inch increments	84	PCB (all samples), particle size and TOC (surface only)
	Floodplain Sampling - floodplain soil samples will be collected from locations to spatially represent the different geomorphic strata and other specific floodplain feature between Otsego City Dam and Lincoln Road (the former channel near the dam, the residential area of the floodplain.	74	OFP-01 through OFP-74	0- to 6-inch, 6- to 12-inch, 12- to 24-inch, 12 inch increments	389	PCB (all samples), particle size and TOC (surface only)
Sediment	Sediment Sampling - 2-3 sediment cores per probing transect will be submitted for analysis. This will include a core near shore and in the mid-channel. 6 sediment cores will be collected from the Pine Creek Dam area Additional samples may be collected from identified sediment deposits in the impoundment (up to 20 locations)	50	OSED-01 to OSED-50	0- to 2-inch, 2- to 6-inch, 6- to 12-inch, 12- to 24-inch, 12 inch increments	315	PCB (all cores), TOC and particle size (surface of all cores and all depth intervals for 20% of cores)
Hydraulic Monitoring	Staff Gage - Establish 2 temporary staff gages. Monitor and record river stage over a range of flow conditions during other sampling activities.	3	OSG-1, OSG-2, OSG-3	NA	• 10	NA
	Flow measurements - Periodically measure flow at two of the staff gages over a range of flow conditions and water elevations.	3	OSG-1, OSG-2, OSG-3	NA	• 10	NA
Erosion Pin Survey	Previous erosion pin survey locations (originally surveyed in 2000) will be reoccupied, surveyed, and monitored on a seasonal basis to develop bank soil and PCB erosion rates for the 10-year intercedent period.	10	OEP-1 through OEP-5	NA	NA	NA

Notes:
TBD - To be determined
NA - Not applicable
Bank and Floodplain soil samples based on an average 5 samples per core (average depth of 48 inches) plus duplicates
Sediment samples based on an average 6 samples per core (average depth of 48 inches) plus duplicates
One new probing/coring transect is also a previous USGS transect.
Bank samples will be collected only from the 8 sediment probing/coring transects.

ARCADIS

Figures



LEGEND:

MAXIMUM SEDIMENT PCB RESULTS (MG/KG):
- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SEDIMENT SAMPLE LOCATION

MAXIMUM SOIL PCB RESULTS (MG/KG):
- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SOIL SAMPLE LOCATION

- FA FOCUS AREAS FOR RECONNAISSANCE
- PREVIOUS CHANNEL
- TERRACE
- APPROXIMATE AREA 3 STUDY AREA BOUNDARY
- APPROXIMATE PINE CREEK STUDY AREA BOUNDARY
- SHORELINE (APPROXIMATE)

0 400 800 Feet

GRAPHIC SCALE

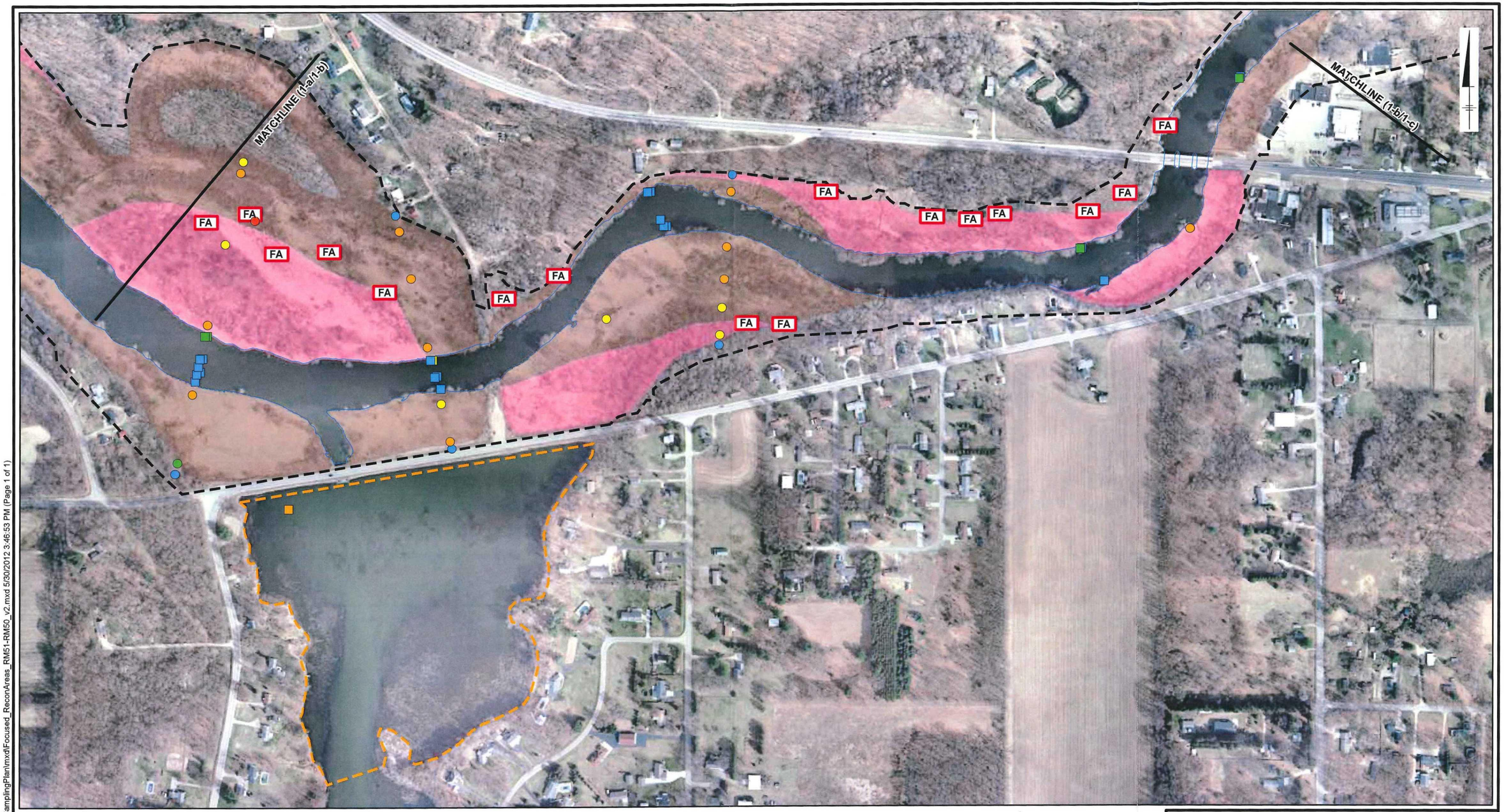
GEORGIA-PACIFIC LLC
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
AREA 3/FORMER OTSEGO IMPOUNDMENT PROPOSED RECONNAISSANCE PLAN AND PRELIMINARY SAMPLING DESIGN

FOCUSED RECONNAISSANCE AREAS IN AREA 3

ARCADIS

FIGURE 1-a

City: SYR Div/Group: 90 Created By: Sruti Pulugurtha Last Saved By: spulugurtha
K:\KRSG\OtsegoCityDamToOtsegoDamFieldSamplingPlan\mxd\Focused_ReconAreas_RM50-RM49_v2.mxd 5/30/2012 4:44:14 PM (Page 1 of 1)



LEGEND:

MAXIMUM SEDIMENT PCB RESULTS (MG/KG):
- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SEDIMENT SAMPLE LOCATION

MAXIMUM SOIL PCB RESULTS (MG/KG):
- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SOIL SAMPLE LOCATION

- FA FOCUS AREAS FOR RECONNAISSANCE
- PREVIOUS CHANNEL
- TERRACE
- APPROXIMATE AREA 3 STUDY AREA BOUNDARY
- APPROXIMATE PINE CREEK STUDY AREA BOUNDARY
- SHORELINE (APPROXIMATE)

0 400 800 Feet

GRAPHIC SCALE

GEORGIA-PACIFIC LLC
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
AREA 3/FORMER OTSEGO IMPOUNDMENT PROPOSED RECONNAISSANCE PLAN AND PRELIMINARY SAMPLING DESIGN

FOCUSED RECONNAISSANCE AREAS IN AREA 3

ARCADIS

FIGURE 1-b

City: SYR Div/Group: 90 Created By: Sruti Pullugurtha Last Saved By: spullugurtha
KRSG (B0064531.0003.00500)
Q:\KRSG\OtsegoCityDamToOtsegoDamFieldSamplingPlan\mxd\Focused_ReconAreas_RM51-RM50_v2.mxd 5/30/2012 3:46:53 PM (Page 1 of 1)

LEGEND:

MAXIMUM SEDIMENT PCB RESULTS (MG/KG):
- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SEDIMENT SAMPLE LOCATION

MAXIMUM SOIL PCB RESULTS (MG/KG):
- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SOIL SAMPLE LOCATION

- FA FOCUS AREAS FOR RECONNAISSANCE
- PREVIOUS CHANNEL
- TERRACE
- APPROXIMATE AREA 3 STUDY AREA BOUNDARY
- APPROXIMATE PINE CREEK STUDY AREA BOUNDARY
- SHORELINE (APPROXIMATE)

0 400 800 Feet

GRAPHIC SCALE

GEORGIA-PACIFIC LLC
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
AREA 3/FORMER OTSEGO IMPOUNDMENT PROPOSED RECONNAISSANCE PLAN AND PRELIMINARY SAMPLING DESIGN

FOCUSED RECONNAISSANCE AREAS IN AREA 3

ARCADIS

FIGURE 1-c

LEGEND:

MAXIMUM SEDIMENT PCB RESULTS (MG/KG):
- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SEDIMENT SAMPLE LOCATION

MAXIMUM SOIL PCB RESULTS (MG/KG):
- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SOIL SAMPLE LOCATION

- FA FOCUS AREAS FOR RECONNAISSANCE
- PREVIOUS CHANNEL
- TERRACE
- APPROXIMATE AREA 3 STUDY AREA BOUNDARY
- APPROXIMATE PINE CREEK STUDY AREA BOUNDARY
- SHORELINE (APPROXIMATE)

0 400 800 Feet

GRAPHIC SCALE

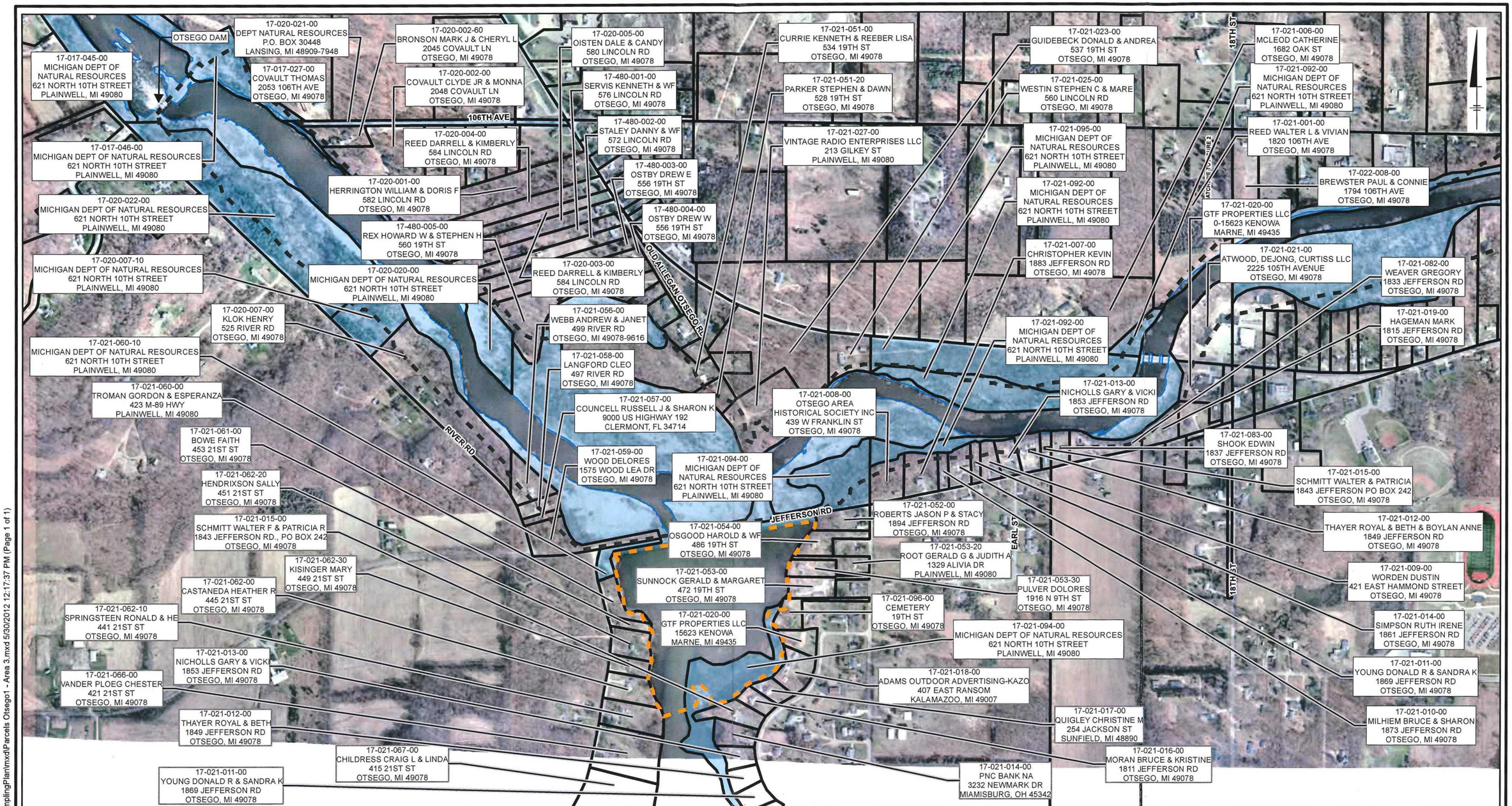
GEORGIA-PACIFIC LLC
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
AREA 3/FORMER OTSEGO IMPOUNDMENT PROPOSED RECONNAISSANCE PLAN AND PRELIMINARY SAMPLING DESIGN

FOCUSED RECONNAISSANCE AREAS IN AREA 3

ARCADIS

FIGURE 1-d

City: SYR Div/Group: 90 Created By: Sruti Pulugurtha Last Saved By: spulugurtha
KRSG (B0064531.0003.00500)
Q:\KRSG\OtsegoCityDamToOtsegoDamFieldSamplingPlan\mxd\Focused_ReconAreas_RM53-RM52_v2.mxd 5/30/2012 4:46:04 PM (Page 1 of 1)



LEGEND:

- APPROXIMATE AREA 3 STUDY AREA BOUNDARY
- APPROXIMATE PINE CREEK STUDY AREA BOUNDARY
- PARCEL BOUNDARY
- SHORELINE
- APPROXIMATE AREA OWNED BY MDNR
- APPROXIMATE AREA OWNED BY CITY OF OTSEGO

NOTES:

1. AERIAL IMAGE DERIVED FROM ORTHOGRAPHIC DATA BY AXIS GEOSPATIAL, LLC. OTSEGO AREA FLOWN SPRING 2010.
2. PARCEL BOUNDARIES PROVIDED BY ALLEGAN COUNTY.
3. LAND ADJACENT TO RIVER, NOT IDENTIFIED BY ALLEGAN COUNTY, ASSUMED TO BE OWNED BY MDNR.

17-021-059-00
WOOD DELORES
1575 WOOD LEA DR
OTSEGO, MI 49078

- TAX PARCEL ID
- OWNER NAME (LAST NAME, FIRST NAME)
- OWNER STREET ADDRESS
- OWNER CITY, STATE & ZIP CODE

0 700 1,400 Feet

GRAPHIC SCALE

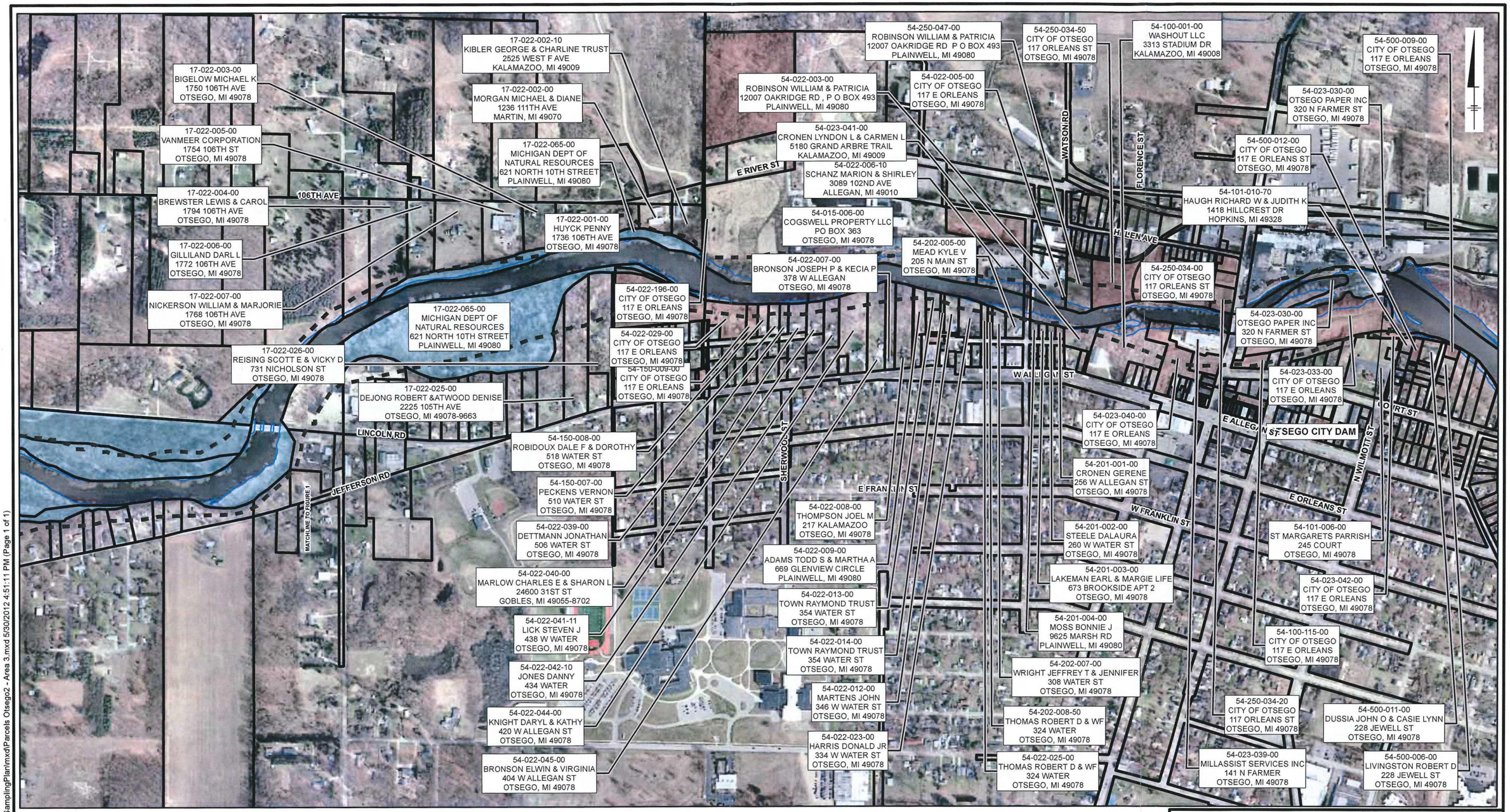
GEORGIA-PACIFIC LLC
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
AREA 3/FORMER OTSEGO IMPOUNDMENT PROPOSED RECONNAISSANCE PLAN AND PRELIMINARY SAMPLING DESIGN

TAX PARCELS RELATED TO AREA 3

ARCADIS

FIGURE
2-a

City: SYR Div/Group: 90 Created By: Sruti Pulugurtha Last Saved By: spulugurtha
KRSG (B0064531.0002.00500)
Q:\KRSG\OtsegoCityDam1\OtsegoDam\FieldSampling\Plan\mxd\Parcels Otsego1 - Area 3.mxd 5/30/2012 12:17:37 PM (Page 1 of 1)



LEGEND:

- APPROXIMATE AREA 3 STUDY AREA BOUNDARY
- APPROXIMATE PINE CREEK STUDY AREA BOUNDARY
- PARCEL BOUNDARY
- SHORELINE
- APPROXIMATE AREA OWNED BY CITY OF OTSEGO
- APPROXIMATE AREA OWNED BY MDNR

NOTES:

1. AERIAL IMAGE DERIVED FROM ORTHOGRAPHIC DATA BY AXIS GEOSPATIAL, LLC. OTSEGO AREA FLOWN SPRING 2010.
2. PARCEL BOUNDARIES PROVIDED BY ALLEGAN COUNTY.
3. LAND ADJACENT TO RIVER, NOT IDENTIFIED BY ALLEGAN COUNTY, ASSUMED TO BE OWNED BY MDNR.

17-021-059-00 — TAX PARCEL ID
WOOD, DELORES — OWNER NAME (LAST NAME, FIRST NAME)
1575 WOOD LEA DR — OWNER STREET ADDRESS
OTSEGO, MI 49078 — OWNER CITY, STATE & ZIP CODE

0 600 1,200 Feet
GRAPHIC SCALE

GEORGIA-PACIFIC LLC
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
AREA 3/FORMER OTSEGO IMPOUNDMENT PROPOSED RECONNAISSANCE PLAN AND PRELIMINARY SAMPLING DESIGN

TAX PARCELS RELATED TO AREA 3

ARCADIS

FIGURE 2-b

City: SYR Div/Group: 90 Created By: Sruti Pulugurtha Last Saved By: spulugurtha
KRSG (B0064531.0002.00500)
Q:\KRSG\OtsegoCityDamToOtsegoDamFieldSamplingPlan\mxd\Parcels Otsego2 - Area 3.mxd 5/30/2012 4:51:11 PM (Page 1 of 1)

OTSEGO DAM

OSG-01

ORT-01

KPT-94

ORT-02

KPT-93

ORT-03

ORT-04

KPT-92

ORT-05

KPT-91

ORT-06

ORT-07

MATCHLINE (2-a/2-b)

LEGEND:

- PROPOSED SEDIMENT SAMPLE LOCATION
- STAFF GAGE LOCATION (APPROXIMATE)
- PROPOSED SURVEY TRANSECT
- PROPOSED SEDIMENT PROBE/CORING TRANSECT
- EXISTING USGS TRANSECT TO BE REOCCUPIED
- EXISTING ARCADIS 1993 SEDIMENT PROBE TRANSECT
- 2010 SEDIMENT PROBE TRANSECT (PERFORMED DURING AREA 2 INVESTIGATION)
- SHORELINE (APPROXIMATE)

MAXIMUM SEDIMENT PCB RESULTS (MG/KG):

- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SEDIMENT SAMPLE LOCATION

MAXIMUM SOIL PCB RESULTS (MG/KG):

- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SOIL SAMPLE LOCATION

- APPROXIMATE AREA 3 STUDY AREA BOUNDARY
- APPROXIMATE PINE CREEK STUDY AREA BOUNDARY

0 400 800 Feet

GRAPHIC SCALE

NOTES:

1. PROPOSED SURVEY TRANSECTS WILL SURVEY TOP OF SEDIMENT ONLY.
2. SEDIMENT PROBING WILL ESTABLISH APPROXIMATELY 10 CORE LOCATIONS PER TRANSECT. A SUBSET OF THESE CORES (2-3 LOCATIONS PER TRANSECT) WILL BE SUBMITTED FOR LABORATORY ANALYSIS.

GEORGIA-PACIFIC LLC
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
AREA 3/FORMER OTSEGO IMPOUNDMENT PROPOSED RECONNAISSANCE PLAN AND PRELIMINARY SAMPLING DESIGN

PROPOSED SEDIMENT INVESTIGATION FOR AREA 3

ARCADIS

FIGURE 3-a

City: SYR Div/Group: 90 Created By: Sruti Pulugurtha Last Saved By: spulugurtha
KRSG (60064531.0003.00500)
Q:\KRSG\OtsegoCityDam\ToOtsegoDamFieldSamplingPlan\mxd\Proposed Sediment Investigation_RM50-RM49.mxd 5/30/2012 5:11:00 PM (Page 1 of 1)

LEGEND:

- PROPOSED SEDIMENT SAMPLE LOCATION
- STAFF GAGE LOCATION (APPROXIMATE)
- PROPOSED SURVEY TRANSECT
- PROPOSED SEDIMENT PROBE/CORING TRANSECT
- EXISTING USGS TRANSECT TO BE REOCCUPIED
- EXISTING ARCADIS 1993 SEDIMENT PROBE TRANSECT
- 2010 SEDIMENT PROBE TRANSECT (PERFORMED DURING AREA 2 INVESTIGATION)
- SHORELINE (APPROXIMATE)

MAXIMUM SEDIMENT PCB RESULTS (MG/KG):

- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SEDIMENT SAMPLE LOCATION

MAXIMUM SOIL PCB RESULTS (MG/KG):

- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SOIL SAMPLE LOCATION

- APPROXIMATE AREA 3 STUDY AREA BOUNDARY
- APPROXIMATE PINE CREEK STUDY AREA BOUNDARY

0 400 800 Feet

GRAPHIC SCALE

NOTES:

1. PROPOSED SURVEY TRANSECTS WILL SURVEY TOP OF SEDIMENT ONLY.
2. SEDIMENT PROBING WILL ESTABLISH APPROXIMATELY 10 CORE LOCATIONS PER TRANSECT. A SUBSET OF THESE CORES (2-3 LOCATIONS PER TRANSECT) WILL BE SUBMITTED FOR LABORATORY ANALYSIS.

GEORGIA-PACIFIC LLC
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
AREA 3/FORMER OTSEGO IMPOUNDMENT PROPOSED RECONNAISSANCE PLAN AND PRELIMINARY SAMPLING DESIGN

PROPOSED SEDIMENT INVESTIGATION FOR AREA 3

ARCADIS

FIGURE 3-b

City: SYR Div/Group: 90 Created By: Sruti Pulugurtha Last Saved By: spulugurtha
KRSG (B0064531.0003.00500)
Q:\KRSG\OtsegoCityDamToOtsegoDamFieldSamplingPlan\mxd\Proposed Sediment Investigation_RM51-RM50.mxd 5/30/2012 5:13:49 PM (Page 1 of 1)

LEGEND:

- PROPOSED SEDIMENT SAMPLE LOCATION
- STAFF GAGE LOCATION (APPROXIMATE)
- PROPOSED SURVEY TRANSECT
- PROPOSED SEDIMENT PROBE/CORING TRANSECT
- EXISTING USGS TRANSECT TO BE REOCCUPIED
- EXISTING ARCADIS 1993 SEDIMENT PROBE TRANSECT
- 2010 SEDIMENT PROBE TRANSECT (PERFORMED DURING AREA 2 INVESTIGATION)
- SHORELINE (APPROXIMATE)

MAXIMUM SEDIMENT PCB RESULTS (MG/KG):

- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SEDIMENT SAMPLE LOCATION

MAXIMUM SOIL PCB RESULTS (MG/KG):

- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SOIL SAMPLE LOCATION

- APPROXIMATE AREA 3 STUDY AREA BOUNDARY
- APPROXIMATE PINE CREEK STUDY AREA BOUNDARY

0 400 800 Feet

GRAPHIC SCALE

NOTES:

1. PROPOSED SURVEY TRANSECTS WILL SURVEY TOP OF SEDIMENT ONLY.
2. SEDIMENT PROBING WILL ESTABLISH APPROXIMATELY 10 CORE LOCATIONS PER TRANSECT. A SUBSET OF THESE CORES (2-3 LOCATIONS PER TRANSECT) WILL BE SUBMITTED FOR LABORATORY ANALYSIS.

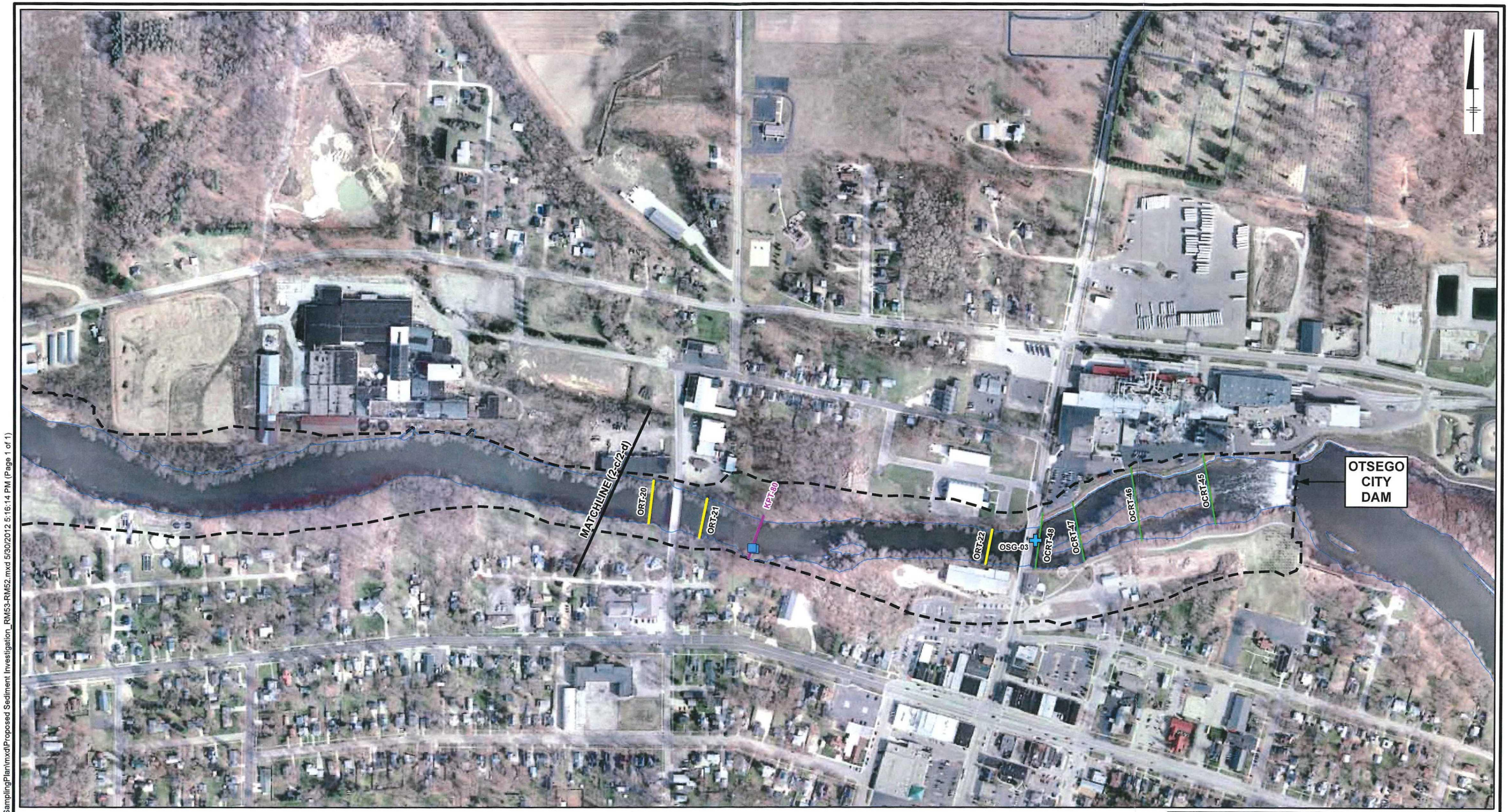
GEORGIA-PACIFIC LLC
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
AREA 3/FORMER OTSEGO IMPOUNDMENT PROPOSED RECONNAISSANCE PLAN AND PRELIMINARY SAMPLING DESIGN

PROPOSED SEDIMENT INVESTIGATION FOR AREA 3

ARCADIS

FIGURE 3-c

City: SYR Div/Group: 90 Created By: Sruti Pulugurtha Last Saved By: spulugurtha
K:\KRSG\Otsego\CityDam\Otsego Dam\FieldSamplingPlan\mxd\Proposed Sediment Investigation_RM52-RM51.mxd 5/30/2012 5:07:32 PM (Page 1 of 1)



LEGEND:

- PROPOSED SEDIMENT SAMPLE LOCATION
- STAFF GAGE LOCATION (APPROXIMATE)
- PROPOSED SURVEY TRANSECT
- PROPOSED SEDIMENT PROBE/CORING TRANSECT
- EXISTING USGS TRANSECT TO BE REOCCUPIED
- EXISTING ARCADIS 1993 SEDIMENT PROBE TRANSECT
- 2010 SEDIMENT PROBE TRANSECT (PERFORMED DURING AREA 2 INVESTIGATION)
- SHORELINE (APPROXIMATE)

MAXIMUM SEDIMENT PCB RESULTS (MG/KG):

- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SEDIMENT SAMPLE LOCATION

MAXIMUM SOIL PCB RESULTS (MG/KG):

- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SOIL SAMPLE LOCATION

- APPROXIMATE AREA 3 STUDY AREA BOUNDARY
- APPROXIMATE PINE CREEK STUDY AREA BOUNDARY

0 400 800 Feet

GRAPHIC SCALE

NOTES:

1. PROPOSED SURVEY TRANSECTS WILL SURVEY TOP OF SEDIMENT ONLY.
2. SEDIMENT PROBING WILL ESTABLISH APPROXIMATELY 10 CORE LOCATIONS PER TRANSECT. A SUBSET OF THESE CORES (2-3 LOCATIONS PER TRANSECT) WILL BE SUBMITTED FOR LABORATORY ANALYSIS.

GEORGIA-PACIFIC LLC
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
AREA 3/FORMER OTSEGO IMPOUNDMENT PROPOSED RECONNAISSANCE PLAN AND PRELIMINARY SAMPLING DESIGN

PROPOSED SEDIMENT INVESTIGATION FOR AREA 3

ARCADIS

FIGURE 3-d

City: SYR Div/Group: 90 Created By: Sruti Pulugurtha Last Saved By: spulugurtha
K:\KRSG\Otsego\CityDam\To\Otsego\Dam\Field\Sampling\Plan\mxd\Proposed Sediment Investigation_RM53-RM52.mxd 5/30/2012 5:16:14 PM (Page 1 of 1)
Q:\KRSG\Otsego\CityDam\To\Otsego\Dam\Field\Sampling\Plan\mxd\Proposed Sediment Investigation_RM53-RM52.mxd 5/30/2012 5:16:14 PM (Page 1 of 1)

OTSEGO DAM

OSG-01
OTBS-01
OTBN-01
OTBN-02
OTBS-02
OTBN-03
OTBS-03
OTBN-04
OTBS-04
OTBN-05
OTBS-05
OTBN-06
OTBS-06
OTBN-07
OTBS-07
OFP-001
OFP-002
OFP-003
OFP-004
OFP-005
OFP-006
OFP-007
OFP-008
OFP-009
OFP-010
OFP-011
OFP-012
OFP-013
OFP-014
OFP-015
OFP-016
OFP-017
OFP-018
OFP-019
OFP-020
OFP-021
OFP-022
OFP-024
OFP-025
T1
T2
T3
T4
T5
PC01
PC02
PC03
PC04
PC08
MATCHLINE (4-a/4-b)

LEGEND:

MAXIMUM SEDIMENT PCB RESULTS (MG/KG):
- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SEDIMENT SAMPLE LOCATION

MAXIMUM SOIL PCB RESULTS (MG/KG):
- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SOIL SAMPLE LOCATION

- EXISTING EROSION PIN LOCATION
- PROPOSED FLOODPLAIN SOIL SAMPLE LOCATION
- PROPOSED BANK PROFILE LOCATION
- EXISTING STAFF GAGE LOCATION (APPROXIMATE)
- UPLAND TOPOGRAPHIC CONTOUR (1 FT)
- APPROXIMATE AREA OWNED BY MDNR
- APPROXIMATE AREA 3 STUDY AREA BOUNDARY
- APPROXIMATE PINE CREEK STUDY AREA BOUNDARY
- SHORELINE (APPROXIMATE)
- PREVIOUS CHANNEL
- TERRACE

0 400 800 Feet
GRAPHIC SCALE

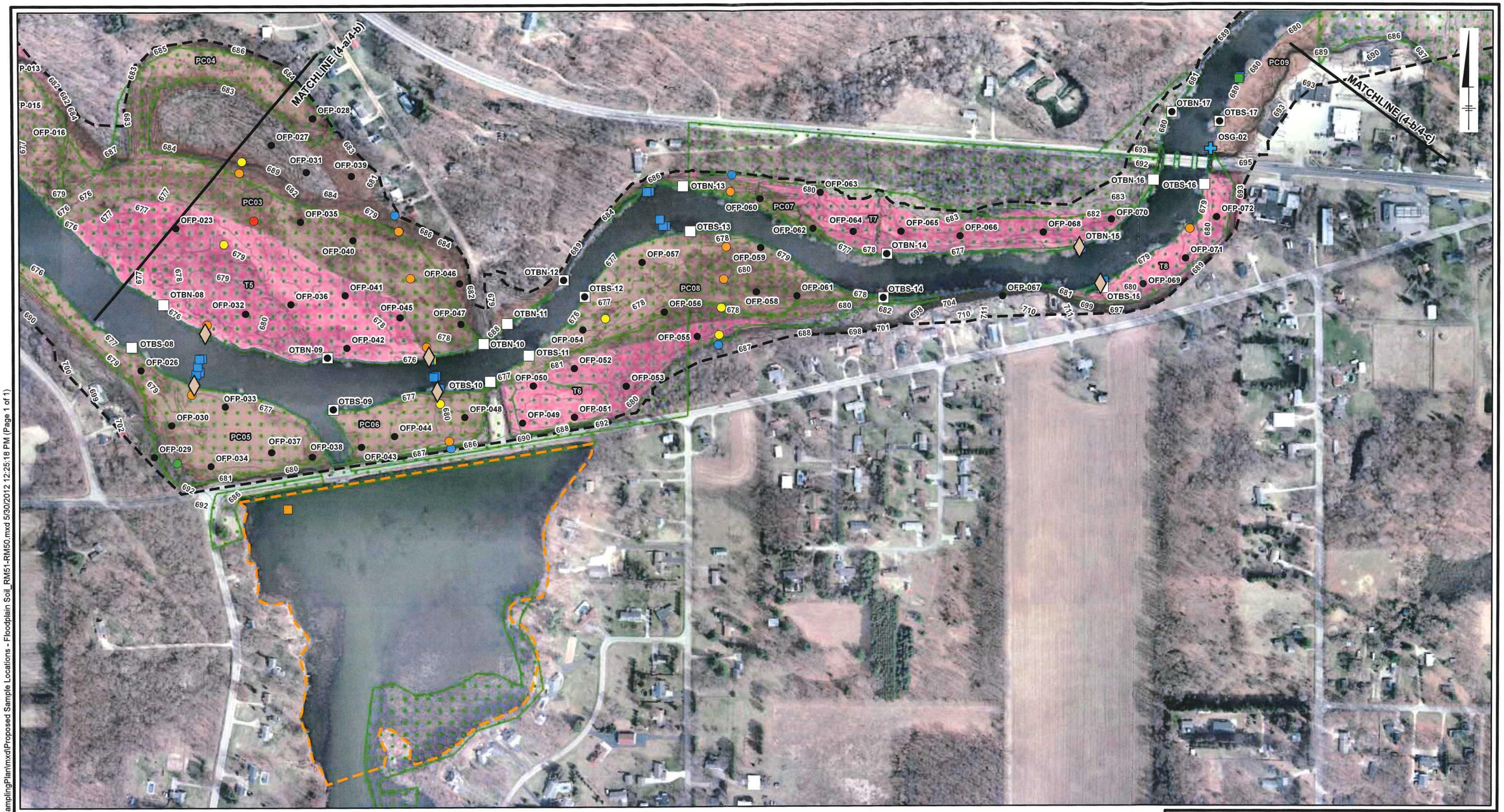
GEORGIA-PACIFIC LLC
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
AREA 3/FORMER OTSEGO IMPOUNDMENT PROPOSED RECONNAISSANCE PLAN AND PRELIMINARY SAMPLING DESIGN

PROPOSED BANK AND FLOODPLAIN SOIL INVESTIGATION FOR AREA 3

ARCADIS

FIGURE 4-a

City: SYR Div/Group: 90 Created By: Sruti Pulugurtha Last Saved By: spulugurtha
KRSG (B0064531.0003.00500)
Q:\KRSG\OtsegoCity\DamToOtsegoDamFieldSamplingPlan\mxd\Proposed Sample Locations - Floodplain Soil_RM50-RM49.mxd 5/30/2012 4:56:36 PM (Page 1 of 1)



LEGEND:

MAXIMUM SEDIMENT PCB RESULTS (MG/KG):

- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SEDIMENT SAMPLE LOCATION

MAXIMUM SOIL PCB RESULTS (MG/KG):

- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SOIL SAMPLE LOCATION

- EXISTING EROSION PIN LOCATION
- PROPOSED FLOODPLAIN SOIL SAMPLE LOCATION
- PROPOSED BANK PROFILE LOCATION
- EXISTING STAFF GAGE LOCATION (APPROXIMATE)
- UPLAND TOPOGRAPHIC CONTOUR (1 FT)
- APPROXIMATE AREA OWNED BY MDNR
- APPROXIMATE AREA 3 STUDY AREA BOUNDARY
- APPROXIMATE PINE CREEK STUDY AREA BOUNDARY
- SHORELINE (APPROXIMATE)
- PREVIOUS CHANNEL
- TERRACE

0 400 800 Feet

GRAPHIC SCALE

GEORGIA-PACIFIC LLC
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
AREA 3/FORMER OTSEGO IMPOUNDMENT PROPOSED RECONNAISSANCE PLAN AND PRELIMINARY SAMPLING DESIGN

PROPOSED BANK AND FLOODPLAIN SOIL INVESTIGATION FOR AREA 3

ARCADIS

FIGURE 4-b

City: SYR Div/Group: 90 Created By: Sruti Pulugurtha Last Saved By: spulugurtha
KRSG (B0064531.0003.00500)
Q:\KRSG\OtsegoCityDam\OtsegoDam\FieldSamplingPlan\mxd\Proposed Sample Locations - Floodplain Soil_RM51-RM50.mxd 5/30/2012 12:25:18 PM (Page 1 of 1)

LEGEND:

MAXIMUM SEDIMENT PCB RESULTS (MG/KG):
- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SEDIMENT SAMPLE LOCATION

MAXIMUM SOIL PCB RESULTS (MG/KG):
- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SOIL SAMPLE LOCATION

- EXISTING EROSION PIN LOCATION
- PROPOSED FLOODPLAIN SOIL SAMPLE LOCATION
- PROPOSED BANK PROFILE LOCATION
- EXISTING STAFF GAGE LOCATION (APPROXIMATE)
- UPLAND TOPOGRAPHIC CONTOUR (1 FT)
- APPROXIMATE AREA OWNED BY MDNR
- APPROXIMATE AREA 3 STUDY AREA BOUNDARY
- APPROXIMATE PINE CREEK STUDY AREA BOUNDARY
- SHORELINE (APPROXIMATE)
- PREVIOUS CHANNEL
- TERRACE

0 400 800 Feet
GRAPHIC SCALE

GEORGIA-PACIFIC LLC
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
AREA 3/FORMER OTSEGO IMPOUNDMENT PROPOSED RECONNAISSANCE PLAN AND PRELIMINARY SAMPLING DESIGN

PROPOSED BANK AND FLOODPLAIN SOIL INVESTIGATION FOR AREA 3

ARCADIS

FIGURE 4-c

City: SYR Div/Group: 90 Created By: Sruti Pulugurtha Last Saved By: spulugurtha
KRSG (B0064531.0003.00500)
Q:\KRSG\OtsegoCity\DamToOtsegoDamFieldSamplingPlan\mxd\Proposed Sample Locations - Floodplain Soil_RM52-RM51.mxd 5/30/2012 4:53:09 PM (Page 1 of 1)

LEGEND:

MAXIMUM SEDIMENT PCB RESULTS (MG/KG):
- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SEDIMENT SAMPLE LOCATION

MAXIMUM SOIL PCB RESULTS (MG/KG):
- ND - 1
- 1 - 5
- 5 - 10
- 10 - 50
- > 50
- MDEQ SOIL SAMPLE LOCATION

- EXISTING EROSION PIN LOCATION
- PROPOSED FLOODPLAIN SOIL SAMPLE LOCATION
- PROPOSED BANK PROFILE LOCATION
- EXISTING STAFF GAGE LOCATION (APPROXIMATE)
- UPLAND TOPOGRAPHIC CONTOUR (1 FT)
- APPROXIMATE AREA OWNED BY MDNR
- APPROXIMATE AREA 3 STUDY AREA BOUNDARY
- APPROXIMATE PINE CREEK STUDY AREA BOUNDARY
- SHORELINE (APPROXIMATE)
- PREVIOUS CHANNEL
- TERRACE

0 400 800 Feet
GRAPHIC SCALE

GEORGIA-PACIFIC LLC
ALLIED PAPER, INC./PORTAGE CREEK/
KALAMAZOO RIVER SUPERFUND SITE
AREA 3/FORMER OTSEGO IMPOUNDMENT PROPOSED RECONNAISSANCE PLAN AND PRELIMINARY SAMPLING DESIGN

PROPOSED BANK AND FLOODPLAIN SOIL INVESTIGATION FOR AREA 3

ARCADIS

FIGURE 4-d

City: SYR Div/Group: 90 Created By: Sruti Pulugurtha Last Saved By: spulugurtha
KRSG (B0064531.0003.00500)
Q:\KRSG\OtsegoCityDamToOtsegoDamFieldSamplingPlan\mxd\Proposed Sample Locations - Floodplain Soil_RM53-RM-52.mxd 5/30/2012 4:54:56 PM (Page 1 of 1)